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Toward College and Career Readiness: How Different Models Produce Similar Short-Term Outcomes

Debra D. Bragg¹ and Jason L. Taylor¹

Abstract
In 2007, the Illinois General Assembly passed the College and Career Readiness Pilot Act that supported the initial implementation of college readiness programming by community colleges and their high school partners. This study uses mixed-methods research to examine program implementation and student outcomes associated with two of seven college and career readiness (CCR) partnerships in Illinois. Our analysis of the local models is guided by Conley’s four dimensions of CCR, and the results shed light on how different programmatic approaches contribute to short-term student outcomes in mathematics and English. This study has implications for Illinois’ efforts to move CCR forward, including for the state’s new Race to the Top (RttT) grant that is attempting to scale up CCR programming associated with science, technology, engineering, and mathematics (STEM) education.

Keywords
community college, college readiness, education policy, policy, implementation, policy evaluation, STEM (science, mathematics, engineering, and technology)

Introduction
The issue of college and career readiness (CCR) is among the most concerning problems facing the educational system in the United States. The United States economy and 21st century workforce are increasingly demanding more citizens with college degrees (Carnavale, Smith, & Strohl, 2010), suggesting high school students need to enter college with the requisite skills to demonstrate that they will be successful

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securing college credentials. Readiness for college entry is a necessary condition to meet the college completion goals established by President Obama and embraced by many states and organizations (Obama, 2009; Russell, 2011). Although the preponderance of recent scholarship on college readiness has focused on developmental education policies and the impact of inadequate college preparation on college success and completion (Bettinger & Long, 2009; Boatman, 2012; Calcagno & Long, 2008; Lesik, 2007; Martorell & McFarlin, 2011), there is also interest in understanding how different approaches reduce the need for developmental education before students graduate high school (e.g., Alliance for Excellent Education, 2011; MDRC, 2013).

### College Preparation and Readiness

A widely cited definition of college readiness offered by David Conley (2010) suggests college readiness is “the level of preparation a student needs in order to enroll and succeed—without remediation—in a credit-bearing course at a postsecondary institution” (p. 21). From this perspective, college readiness is determined by students’ ability to bypass remedial or developmental education and place directly into college-level courses based on normative ways of determining students’ academic readiness. High school students’ readiness for college is often determined and measured by the intensity of students’ high school courses and their performance on standardized college entrance exams. For example, national data from ACT show that only one in four high school students are college ready in English, reading, mathematics, and science, according to ACT’s college readiness benchmarks (ACT, 2012a). In Illinois, the proportion of high school students that meet college readiness standards in all four of these content areas is also 25%, but Illinois is below the national average based on subscores for the four content areas (ACT, 2012b). These data also show that 31% of Illinois high school students did not meet any of ACT’s college readiness benchmarks in English, reading, mathematics, or science. Arguably more alarming are the disparities in college readiness observed for racial and ethnic group. For example, 42% of Asian students, 32% of White students, 17% of Pacific Islanders, 13% of Hispanic students, 11% of American Indians, and 5% of Black students are college ready in all four subjects (ACT, 2012b).

ACT data are corroborated by evidence of student enrollment in developmental education at the postsecondary level. Data from the National Postsecondary Aid Study reported that approximately 20% of first-year undergraduate students participated in developmental education in 2007-2008 (Sparks & Malkus, 2013), and Complete College America (CCA; 2012) showed an even larger proportion of students participating in developmental course work. Based on a fall 2006 cohort of students from 33 states, approximately 52% of students entering a 2-year college and 20% of students entering a 4-year college enrolled in remediation (CCA, 2012). CCA data for Illinois showed that 49% of first-time students in the fall 2006 cohort enrolled in developmental mathematics or English courses (Illinois Community College Board, 2012). These sort of data have generated calls for reform across the country (U.S. Department of Education, 2010), prompting some states to take action. In this regard, the Illinois
General Assembly’s enacted legislation to fund local CCR pilot projects led by community colleges and their secondary school partners.

The Illinois College and Career Readiness Pilot Program

Illinois’ College and Career Readiness Pilot Program was passed in 2007 as an amendment to Section 5 of the Public Community College Act. The law authorized funding for community colleges and their high school partners to develop and offer pilot programs to improve high school students’ CCR. A primary goal of the law was to support the alignment of K-12 mathematics and English (reading and writing) curriculum with college-level coursework to prepare students to transition from high school to college without the need for remediation. The initial legislation noted that the law would provide “a direct and significant link between students being academically prepared for college and success in postsecondary education” (PL 095-0694, Section 5 of the Public Community College Act, Sec. 2.24). Academic interventions in mathematics and English (reading and writing) were the focus of Illinois’ pilot programming to prepare students who are assessed below the college level to be able to transition to college without needing remediation.

Funds for CCR were awarded by the state coordinating board, the Illinois Community College Board (ICCB), for five pilot projects (seven community colleges) with their partner high schools. The initial target population for the pilot projects was high school juniors and seniors who fell short of the mathematics or English ACT cut-off scores needed to place into college. Whereas the student populations differed in geographic location in the state, with two located in the Chicago metropolitan area and three in the central and southern part of the state, all five projects served communities with sizeable minority, low-income populations. Optimistic about the benefits of the pilot, Illinois’ new law claimed: “Greater college and career readiness will reduce the need for remediation, lower educational costs, shorten time to degree, and increase the overall success rate of Illinois college students” (PL 095-0694, Section 5 of the Public Community College Act, Sec. 2.24).

After 3 years (2007-2010), the ICCB and the General Assembly passed an Amendatory Act extending the pilot program for 3 more years, from 2010 to 2013. The five core elements of the amended Act were similar to the original legislation, with one important exception. Due largely to difficulties sharing student-level ACT scores between high schools and community colleges, the new law expanded the forms of assessment that could be used to declare a student eligible for CCR. The five legislated elements of the CCR program appear in the following, beginning with the element addressing assessment:

- diagnosis of college readiness by developing a system to align ACT scores or alternative college placement examination scores to specific community college courses in developmental and freshman curriculums;
- reduction of remediation by decreasing the need for remedial coursework in mathematics, reading, and writing at the college level;
• alignment of high school and college curriculums;
• provision of resources and academic support to students to enrich the senior year of high school through remedial or advanced coursework and other interventions;
• development of an appropriate evaluation process to measure the effectiveness of readiness intervention strategies (Amendatory Act to Public Act 095-0694).

The five pilots that began in 2007 were invited by the ICCB to continue during the added 3-year period, and two additional community colleges were invited to join the pilot project. These colleges were chosen because they were already engaged in activities akin to CCR within their districts, positioning them to move quickly to identify secondary partners and begin the state’s pilot initiative. (Documentation of the evolution of Illinois’ CCR pilot initiative can be found in Baber, Castro, & Bragg, 2010; Castro, Bragg, Khan, Baber, & Common, 2010; Khan et al., 2009.) Over time, state leaders and local practitioners were urged to examine Conley’s (2010, 2012) model and consider ways to align their CCR pilot programs with the dimensions of CCR that his framework was proposing (Baber et al., 2010; Bragg, Baber, & Castro, 2011). However, adoption of Conley’s model was not required, but rather used as an instructive vehicle to assist local practitioners to develop program components needed to address CCR.

A legislated requirement of the state’s CCR pilot initiative was evaluation of the local programs, including evaluating the programmatic approaches that the sites were using, including components that distinguished one pilot project from another. The complexity of the evaluation was heightened by the level of autonomy that the local pilot projects were given for program design and delivery, meaning each pilot needed to be treated independently for the purposes of measuring implementation and impact (Baber, Barrientos, Bragg, Castro, & Khan, 2009). Given this, we found it extremely important to ground Illinois’ pilot activity in the larger literature on CCR to give perspective to the meaningfulness of the data and consider implications beyond the state.

**Literature Review**

Developmental education is undergoing public scrutiny and reform in the United States. The scope and types of reforms associated with state and institutional efforts vary and include many strategies intended to both reduce the need for high school students to enroll in remediation and improve the success of students currently enrolled in developmental education (Quint, Jaggars, & Byndloss, 2013). In their synthesis of institutional approaches to redesigning developmental education, Rutschow and Schneider (2012) identified four broad approaches: (a) interventions to help students avoid developmental education before college, (b) interventions that accelerate students’ progress through developmental education, (c) programs that contextualize developmental or basic skills content with occupational or college content, and (d) programs that provide support services such as tutoring or advising for students. The focus of Illinois’ policy and the focus of this literature review is on reforms that
are intended to help high school students avoid developmental education before they enroll in college. Because state-level initiatives are rather rare in the United States, it is important to understand how Illinois’ CCR pilot programs are influencing students’ readiness for college before high school graduation.

**Early Assessment and College Readiness State Policies**

Prior to the conceptualization, development, and implementation of the Common Core State Standards and the Partnership for Assessment of Readiness of College and Careers (PARCC) and Smarter Balanced assessments, individual states were piloting and experimenting with college readiness assessments and curricula intended to prepare high school students for college and reduce the need for remediation. These state efforts vary and include interventions such as early testing and warning systems, summer bridge programs, and other types of transition courses (Barnett, Fay, Bork, & Weiss, 2013). Two notable CCR efforts have been implemented in California and Texas that are aimed at improving high school students’ readiness for college-level work. In 2006, California implemented the Early Assessment Program (EAP) that was designed “to bridge the gap between K-12 educational standards in English and mathematics and the requirements and expectations of postsecondary education at California State University” (Howell, Kurlaender, & Grodsky, 2010, p. 729). The EAP consisted of three voluntary activities, including early college readiness testing of high school juniors in math and English, high school teachers’ professional development, and supplemental preparation materials for high school seniors who are not college ready. Howell et al. (2011) evaluated the EAP program, using data from the 2001-2002 academic year (AY02) to the 2004-2005 academic year (AY05) to examine the effect of participation in the EAP test in 11th grade on students’ remedial needs in the California State University (CSU) system. After controlling for individual and high school characteristics, the researchers found that taking the EAP test as a junior reduced the probability of students needing remedial English and mathematics at CSU by 6.1% and 4.1%, respectively. They tested additional models to account for students’ self-selection, and these results held. Although promising, qualitative research conducted by Tierney and Garcia (2011) revealed the EAP did not necessarily change students’ behavior as intended. Tierney and Garcia concluded that a state early warning system that merely provides information to students is an inadequate solution to improve college readiness.

The Texas Higher Education Coordinating Board supported 22 colleges in the implementation of summer bridge programs designed to reduce the need for remediation (Barnett et al., 2012; Wathington et al., 2011). These summer bridge programs, offered mostly to graduated high school seniors, were designed with four features: acceleration, academic support services, college knowledge, and the opportunity for a financial stipend of $400 (Wathington et al., 2011). Eight colleges participated in a random assignment evaluation that followed a cohort of students that participated in a summer bridge from 2009 to 2011 and compared their educational outcomes to a control group of students (Barnett et al., 2012). Because of the random assignment design,
the authors attributed differences in short-term outcomes to participation in the bridge programs; however, 2 years after bridge participation, results showed no impact on the average number of credits attempted or earned and no impact on persistence. Specifically, the bridge students completed their first college-level mathematics and writing courses at significantly higher rates than the control groups during the first 1.5 years of the program, but the difference faded and was not statistically significant by spring 2011. These modest effects led the authors to conclude that “simple, short-term [developmental education] interventions yielding strong, long-term effects are difficult to find” (Barnett et al., 2012, p. ES-5). Comprehensive interventions involving strong secondary and postsecondary partnerships that begin student involvement earlier in high school were recommended.

Both CCR efforts in California and Texas fall within the domain of early college readiness assessments and transition curricula recently described by Barnett et al. (2013). Barnett et al. reviewed state policies and programs and spoke with state leaders to determine the extent of early assessments and transition curricula, and they found evidence of statewide early college readiness assessments in 25 states. They also found statewide transition curricula in 8 states. In a separate study, Achieve (2012) reported that 18 states administered some form of testing, typically standardized college admission exams such as the ACT or SAT, to all high school students to determine college readiness. Alternatively, a few states (e.g., California, Georgia, and Oregon) offered state-specific assessments to make this determination.

Recently, 14 states joined a consortium organized by the Southern Regional Education Board (SREB) to develop and implement transitional courses for CCR in conjunction with implementation of the Common Core State Standards (SREB, 2013). The purpose of these transitional courses is to help high school students who are not college ready, as determined by an early assessment test, become college ready and reduce the requirement to take developmental education courses before enrolling in college.

Beyond these most rigorous studies, we found little evidence of adoption of state-level CCR policy and pilot programming such as Illinois’ CCR pilot initiative in other states. Moreover, we found almost no evidence of mixed-methods studies that assess student outcomes relative to CCR programming at the state level.

A College and Career Readiness Framework

Because David Conley’s (2010, 2012) model of college readiness was introduced to Illinois’ CCR pilot projects, we used this same frame to guide our analysis. Expanding his definition from 2010, Conley’s (2012) definition of college readiness suggests that a student who is college ready “can qualify for and succeed in entry-level, credit-bearing college courses leading to a baccalaureate or certificate, or career pathway-oriented training programs without the need for remedial or developmental coursework” (p. 1). The four dimensions of Conley’s model have evolved from 2010 to 2012, resulting in the following description: (a) key cognitive strategies refers to ways of thinking required to be successful in college-level coursework, including generating hypotheses and
problem solving, analyzing and evaluating information and conflicting perspectives, and monitoring and confirming the accuracy of one’s work; (b) key content knowledge refers to foundational knowledge and content in core disciplines, such as mathematics and English, and an understanding of knowledge structure as well as how students interact with knowledge, how they perceive knowledge, and how they engage in learning and their level of effort to learn; (c) key learning skills and techniques refers to two categories of student ownership of learning referring to traits such as self-efficacy, motivation, self-awareness, and goal setting and specific learning techniques such as collaborative learning, study skills, time management, and strategic reading; and (d) key transition knowledge and skills, previously referred to as college knowledge, refers to information needed to navigate the transition to college, including specialized knowledge pertaining to a student’s act of going to or transitioning to college. Taken together, Conley argues these four dimensions reflect the fundamental characteristics of and contributors to CCR among incoming college students.

Methods

This study focused on short-term student outcomes associated with two of Illinois’ CCR sites and drew from extensive qualitative data to understand how the selected CCR models related to the student outcomes. Although far from universally successful, both sites produced some of the most positive short-term student outcomes associated with Illinois’ CCR pilot initiatives. Wanting to understand this phenomenon, we analyzed the sites’ programmatic approaches by backward mapping from the student outcome results obtained from our most recent CCR evaluations to previous program implementation results. The three questions that guided our analysis were:

1. What short-term student outcomes resulted from the two local CCR pilot initiatives?
2. What models and program components were implemented by the two CCR pilot initiatives?
3. How do the CCR pilot initiatives compare to one another and contribute to the short-term student outcomes?

A mixed-methods, qualitative-dominant research design (Creswell & Plano Clark, 2007; Greene, 2007) guided our study. We drew from data gathered from the multiyear CCR pilot program evaluation, including field visits conducted over a 2- to 5-year period, depending on when the sites were funded. We selected two colleges for this analysis; one is referred to as Prairie College, and this college received funding for 2 years, and the other college, referred to as River College, received funding for 5 years. Each college was visited once or twice per year for a 1- or 2-day period during which the research team conducted interviews, focus groups, and classroom observations. One-on-one semistructured interviews with administrators, faculty, and support personnel and focus groups with students were the dominant forms of data collection. Also, program graduates who were enrolled at the community college were selected.
for one-on-one interviews. Semistructured interviews also took place at partner high schools where principals, teachers, counselors, and students were interviewed and classroom observations were conducted. Phone calls and e-mail correspondence provided supplemental information about the CCR programs and student participation and outcomes. Thematic coding was conducted on the qualitative data using Conley’s (2010, 2012) framework to identify themes and patterns indicative of each site’s theory of change and programmatic approach.

In the absence of a longitudinal state data system to capture student records on CCR, quantitative data were collected using a student information system developed for the express purpose of capturing student-level demographic, academic history, program participation and completion data, and pre- and posttest data for the CCR evaluation. Our research team worked closely with personnel associated with each pilot program to develop a protocol and electronic data collection system to gather student information and verify results after submission by the local sites. This system was implemented during AY11 and AY12, providing the primary basis for the student outcomes results reported herein. These data were analyzed descriptively and using inferential statistics, including using measures of central tendency, chi square, and t-tests to test relationships between student characteristics and short-term outcomes by site.

Supplementary to the aforementioned methods was the development of a logic model to reflect the collective theory of change for CCR in Illinois (see Figure 1). This aspect of the research was informed by Funnell and Rogers (2011), who argued a program’s theory of change is “an explicit theory or model of how an intervention contributes to a set of specific outcomes through a series of intermediate results” (p. 31). They claimed three primary ways to develop a program theory are: (a) articulating mental models, (b) using deductive approaches, and (c) using inductive approaches. We used all three strategies, but also relied heavily on stakeholders’ articulation of their mental models as they engaged in implementation throughout the pilot project. According to Funnell and Rogers, understanding mental models enhances understanding of program theory by providing a visual and conceptual representation of “how various stakeholders believe a planned or existing program will achieve what it is designed to do” (p. 103). Of particular relevance to our study, Greene (2007) advised that mixed-methods research is enhanced by using logic models that capture practitioners’ mental models of how programs actually work.

In addition to the composite model, we elicited information to help formulate graphic representations of mental models in the form of logic models for each site (Funnell & Rogers, 2011). We created these initial models by studying sites’ proposals to procure state funding for CCR, followed by analyzing qualitative data that informed interactive, conversational activities with practitioners about their CCR program design and implementation. We then presented graphic representations of the logic models to the practitioners, and we asked them to clarify, correct, elaborate, and explain their models. This enhanced form of member checking was instrumental in our team’s understanding of what the pilot programs were attempting to do and what they
were actually achieving. Our team also drew upon all previous reports on Illinois’ CCR pilots to triangulate the local logic models (Baber et al., 2009; Bragg, Baber, Cullen, Reese, & Linick, 2011; Khan et al., 2009).

The student outcomes that were the focus of this analysis were student completion of the CCR pilot program (intervention), developmental education level gain as determined by the college placement exam, and college readiness in mathematics as determined by posttest scores on the college placement exam.

We begin our discussion of findings by presenting short-term student outcomes, we then describe the two CCR programs, and we conclude with a discussion of the ways the two pilots demonstrate alignment with Conley’s (2010, 2012) framework. These results form the basis for conclusions and implications for future CCR programs in Illinois and elsewhere.

Results

To situate the short-term student outcomes of Prairie College and River College in the larger CCR pilot study, Table 1 displays the aggregate outcomes for all seven colleges for AY11 and AY12, the 2 years the most complete student-level data set
Table 1. Aggregate Outcomes for All College and Career Readiness (CCR) Colleges (%).

<table>
<thead>
<tr>
<th>Site</th>
<th>Lake College</th>
<th>Forest College</th>
<th>Prairie College</th>
<th>Valley College</th>
<th>Suburban College</th>
<th>Central College</th>
<th>River College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completers (AY11)</td>
<td>98</td>
<td>96</td>
<td>71</td>
<td>91</td>
<td>70</td>
<td>68</td>
<td>78</td>
</tr>
<tr>
<td>Completers (AY12)</td>
<td>75</td>
<td>80</td>
<td>83</td>
<td>84</td>
<td>98</td>
<td>78</td>
<td>68</td>
</tr>
<tr>
<td>Raw score gain (AY11)</td>
<td>32</td>
<td>86</td>
<td>60</td>
<td>84</td>
<td>98</td>
<td>78</td>
<td>68</td>
</tr>
<tr>
<td>Raw score gain (AY12)</td>
<td>65</td>
<td>51</td>
<td>82</td>
<td>44</td>
<td>67</td>
<td>81</td>
<td>80</td>
</tr>
<tr>
<td>Placement level gain (AY11)</td>
<td>21</td>
<td>NA</td>
<td>40</td>
<td>19</td>
<td>43</td>
<td>NA</td>
<td>47</td>
</tr>
<tr>
<td>Placement level gain (AY12)</td>
<td>31</td>
<td>NA</td>
<td>NA</td>
<td>27</td>
<td>47</td>
<td>NA</td>
<td>51</td>
</tr>
</tbody>
</table>

Note. NA indicates not available because the site did not administer a placement exam.

was assembled. Despite their modest results, Prairie and River Colleges the highest percentage of students who completed the CCR program, made a raw score gain based on their pre- and posttest assessment scores, and showed a gain in developmental education level based on pre- and posttest scores. Approximately 40% to 50% of students at each college improved at least one developmental course level after participation in the CCR program. Whereas 40% to 50% is not an especially impressive result, relative to other pilot sites, these two CCR programs stood out as potentially the most instructive to Illinois’ future CCR initiative. Deeper analysis of these two sites was thought to have potential to offer insights into program designs for other CCR partnerships, including the state’s Race to the Top (RttT) initiative that was attempting to integrate CCR with STEM education.

Table 2 displays the combined enrollment and the characteristics of students in the AY11 and AY12 cohorts. The total number of students enrolled in two cohorts in the Prairie CCR program was 314, and the total number enrolled in two cohorts at River College was 188. Information on student characteristics displayed in Table 2 reveal several distinct differences between Prairie College and River College students. Most notable is that Prairie College predominantly enrolled high school juniors whereas River College predominantly enrolled high school seniors. Also, Prairie College reported more students in the 22 to 24 and 25 and above ACT composite score ranges compared to River College’s students, 22% versus 7%, respectively. Forty percent of River College’s CCR students were at the 18 or below ACT score range compared to 31% of Prairie College’s CCR students, suggesting the two colleges were targeting substantially different student groups.

Furthermore, River College enrolled a more racially and ethnically diverse student group than Prairie College; specifically, 29% of the CCR students at River College were African American compared to 5% of Prairie College’s CCR students. Whereas these statistics reflect the difference in the overall student demographics between the two schools, there are differences in how reflective the CCR students are of the race/ethnicity of the overall student populations within the colleges. The River College CCR program over-enrolled African American students relative to their percentage in the college student population, at 22%, and the Prairie College CCR program
under-enrolled this group relative to the college student population, at 15%. Neither CCR program enrolled other racial or ethnic minority students in substantial numbers despite the fact that the Latino population was nearly 10% of Prairie College’s overall student population (but under 3% of River College’s student population). The majority of the students in both sites’ CCR programs was female, which is reflective of their representation in the overall student population of both schools.

**Short-Term Outcomes**

Table 3 shows the completion, raw score gains, and placement level gains for both sites by cohort. In the two cohorts reported for each site, approximately 70% to 80% of the participating CCR students completed their mathematics or English course, although the percentage completing was lower for the AY12 cohort at River College than the AY12 cohort at Prairie. For both sites and both cohorts, nearly half of the students showed a gain in their raw scores that suggests an increase in content
knowledge in mathematics or English as assessed by college placement exams or a locally determined exam. When raw Compass scores were applied to locally determined placement scores for the AY1011 cohort, approximately 40% of Prairie students and 47% of River students improved one developmental education level. That is, these students placed into the next highest level of developmental education (or the first-college level course) based on their posttest score, demonstrating their attainment of college readiness according definitions evidenced in the literature and policy (e.g., Conley, 2010, 2012). We observed a similar pattern and a slight increase in the percentage of students placing a level higher at River College in the AY12 cohort, but due to the use of a different pre- and posttest at Prairie College in AY12, we were unable to compute placement level gain. However, given the larger proportion of students whose raw score increased in the AY12 cohort, it seems reasonable to assume that a proportion of those students would have improved a placement level.

We also calculated the number and percentage of students who, based on their posttest placement scores, were college ready in mathematics, meaning that they placed into a college-level math course (not displayed in table). For the 112 high school seniors participating in the River College CCR program who had sufficient data to compute college readiness in mathematics, we found 49 students or 44% were college ready based on their posttest score. Results for high school juniors participating in Prairie College’s CCR program were less compelling. Of the 125 students in the AY11 cohort (the only year for which these data are available) who participated in a mathematics intervention and reported pre- and posttest scores, only 16% were college ready, despite the higher proportion of this group with ACT scores in the 22 to 24 and 25 and above ranges.

We also examined differences in short-term outcomes based on student characteristics and academic performance (Table 4). Chi square and t-test results revealed differences in short-term student outcomes at River College. For students in this school, we found that the average ACT composite score and high school GPA were significantly higher for students who completed the CCR program and who gained a developmental level than students who did not complete the CCR program and demonstrate

<table>
<thead>
<tr>
<th>Table 3. College and Career Readiness (CCR) Outcomes by Site and by Cohort (%)</th>
<th>Prairie College</th>
<th>River College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CCR completion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010 Cohort</td>
<td>71</td>
<td>78</td>
</tr>
<tr>
<td>2011 Cohort</td>
<td>83</td>
<td>68</td>
</tr>
<tr>
<td>Raw score gain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010 Cohort</td>
<td>60</td>
<td>77</td>
</tr>
<tr>
<td>2011 Cohort</td>
<td>82</td>
<td>80</td>
</tr>
<tr>
<td>Placement level gain</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010 Cohort</td>
<td>40</td>
<td>47</td>
</tr>
<tr>
<td>2011 Cohort</td>
<td>N/A</td>
<td>51</td>
</tr>
</tbody>
</table>
Table 4. College and Career readiness (CCR) Outcomes by Site and by Student Characteristics.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Completed</th>
<th>Did not complete</th>
<th>Gained at least one placement level</th>
<th>Did not gain placement level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prairie Community College</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74</td>
<td>26</td>
<td>31</td>
<td>69</td>
</tr>
<tr>
<td>Female</td>
<td>80</td>
<td>20</td>
<td>44</td>
<td>56</td>
</tr>
<tr>
<td>Grade level (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11th</td>
<td>75</td>
<td>25</td>
<td>36</td>
<td>64</td>
</tr>
<tr>
<td>12th</td>
<td>84</td>
<td>16</td>
<td>56</td>
<td>44</td>
</tr>
<tr>
<td>Missing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ACT composite score</td>
<td>18.9</td>
<td>19.0</td>
<td>19.2</td>
<td>18.8</td>
</tr>
<tr>
<td>Mean high school GPA</td>
<td>2.6</td>
<td>2.6</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>Race/ethnicitya (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latino</td>
<td>92</td>
<td>8</td>
<td>67</td>
<td>33</td>
</tr>
<tr>
<td>Asian</td>
<td>100</td>
<td>0</td>
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<td>12th (%)</td>
<td>72</td>
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<td>Mean ACT composite score</td>
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<td>16.8</td>
<td>18.2***</td>
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<tr>
<td>Mean high school GPA</td>
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<td>2.8***</td>
<td>2.0</td>
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<td>Race/ethnicitya (%)</td>
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Note. All students did not have pre- and posttest scores.

*aCell sizes too small (<5) to test for association.

*p < .05. **p < .01. ***p < .001.

a level gain. No statistically significant difference in ACT composite score and high school GPA was observed for students who completed Prairie College’s CCR program compared to those who did not. Race/ethnicity and gender were not related to short-term outcomes in either college.
As previously noted, the relatively similar short-term outcomes observed for Prairie College and River College students led us to examine the models and programmatic approaches that might explain these short-term outcomes, given the different approaches employed by the two sites. What follows is our description of the CCR models implemented by the two sites, using Conley’s model to analyze how the different models may have contributed to short-term student outcomes.

**The College Readiness Models**

We describe the two sites based on Taylor et al.’s (2012) cross-site logic model that included four primary dimensions associated with Illinois’ CCR Pilot legislation: (a) college readiness diagnosis and student recruitment and selection, (b) academic intervention, (c) student support services, and (d) alignment (see, again, Figure 1). These four dimensions were common among all seven CCR sites, but as noted in the following, these elements differed at the two sites.

**The Prairie College Model.** Prairie College was one of two colleges added to the CCR program in 2010 when the CCR legislation was reauthorized. Selected, in part, because the college had begun CCR activities with area high schools prior to the state’s legislation, this college moved quickly to solidify a plan to work with 11 district high schools to diagnose college readiness and administer the Compass placement exam to high school juniors. The college’s strategy included traveling to high schools and bringing high school students to Prairie College to administer the Compass placement exam. For high school juniors who did not test college ready in mathematics and/or English, the placement test was given with sufficient time for students to adjust their senior schedule and enroll in academic courses that would prepare them for college by the time they graduated high school. Thus, a key component of Prairie College’s model was adjustment of the senior year schedule to ready students for college before their matriculation to college, suggesting the test was more than a wake-up call (Tierney & Garcia, 2011). Students who tested college ready on the Compass placement were rewarded with a tuition waiver for a free dual credit course at Prairie College. During AY11, 221 students received a tuition waiver for a dual credit course.

Student recruitment into the academic intervention was conducted at five area high schools and based primarily on students’ ACT, PACT, or Compass placement score in English and mathematics. The primary programmatic focus of the programs was a semester- or year-long mathematics course called Math Instructional Support (MIS), which was designed as a self-paced modularized learning environment using MyMathXL, ALEKS, or Carnegie software. Implementation varied slightly among the five high schools implementing the MIS, but students were typically enrolled during the school day or before or after school for 3 to 5 days per week. The mathematics content was individualized to each student based on computerized, adaptive results of the initial assessment and student progress. Most MIS instructors were high school teachers or retired high school teachers who served as a liaison to Prairie College.
Instructors facilitated the class session and were responsible for monitoring students and responding to their inquiries as they progressed through the modularized software. In addition to MIS, an 8-week summer bridge program was offered on the Prairie College campus (AY11 only) in mathematics and English to students from 11 feeder high schools. Students used the bridge for high school credit recovery or to continue toward college-level courses.

Student support services were limited in scope compared to other Illinois CCR programs, and they depended on the student population being addressed. The most extensive student supports were offered to students participating in the summer bridge where mandatory tutoring and homework sessions, free books, and free tuition were offered. For the larger secondary student population, Prairie College personnel offered KnowHow2Go presentations (typically for 30 minutes), they offered a Freshmen Orientation Night, and they provided testing, placement, and coursetaking advice at the time that the high school students took the placement exam. These various communications strategies gave area secondary students an awareness of college expectations, including messaging the importance of taking 4 years of high school mathematics, taking challenging college preparatory courses in math and English, and getting good grades and not skipping class. However, their intent was not to provide ongoing support for students participating in the MIS program, and no funding was allocated from the CCR grant for this purpose.

Finally, alignment activities were developed and implemented to encourage dialogue between the high school and college mathematics and English faculty to support the sharing of course content and pedagogical similarities, course syllabi and assignments, and textbooks and learning outcomes. Along with these alignment activities, Prairie College drew upon the expertise of area school district leaders who had signed up for a leadership advisory council that was formed prior to the grant. Local practitioners described this leadership advisory council as giving direction and counsel during the period when Prairie College was implementing the CCR program.

To summarize, the Prairie College’s CCR model included early college placement testing; supplementary modules delivered in the high school to support improved student readiness in mathematics; a summer bridge offering mathematics and English, including content to support high school credit recovery or advance toward college-level instruction; limited student support services; and faculty engagement and leadership advisement in alignment of curriculum extending from high school to the community college.

The River College Model. River College created the College Success Initiative (CSI) that was first implemented in 2007 in conjunction with the initial CCR legislation. Beginning with two feeder high schools whose students demonstrated especially low academic achievement, four to six high schools were added each subsequent year to bring the network to a total of 26 high schools by the end of AY12. The CSI intervention represented what our research team labeled a “comprehensive” model because it included both mathematics and English and integrated student support services into
the academic intervention. River College’s program leadership also supplemented the state-mandated evaluation with its own qualitative and quantitative data and collaborated with our research team to analyze and interpret it.

It should be noted that in actuality, River College’s work with the partner high schools began before the CCR legislation when the mathematics department began offering secondary students the college placement exam in the spring of their junior year on the school campuses. Drawing on these relationships, River College personnel began informing admissions and counseling personnel about the intended benefits of CSI, and they hosted parent orientation nights at the high schools to inform students and parents about the program. To recruit students, the academic files of high school seniors were screened by secondary administrators and faculty, and students falling in the range of 16 to 21 on the ACT mathematics exam and 14 and 20 on the ACT reading exam were invited to a meeting to explain the program relative to how developmental education works at the community college. In cases when ACT scores were not available, students who were thought to be able to benefit from CSI were advised to take the community college’s college placement test, the Compass, to determine program eligibility. Upon entry, all students signed a contract indicating their commitment to participate fully in the CSI program.

Delivery of content was on the college campus in classroom format, and CSI instructors also provided students with supplementary materials, including “study sheets” that addressed study strategies, time management, and learning styles. In addition, students were invited to participate in River College’s Freshman Seminar and attend a “Learning Enrichment” Drop-In Program held 2 days a week to give them the opportunity to complete their mathematics homework and get assistance from River College faculty to solve math problems. Students earned a small stipend for fulfilling all participation requirements.

The involvement of faculty employed by River College and the partner high schools in curriculum alignment expanded each year of the grant. The goal of the faculty groups was to facilitate dialogue about the optimal alignment of mathematics and English curriculum from high school to college. These groups shared information, reviewed sample assignments that showed a school’s preferred pedagogy and instructional methods, and normed instruction and assessment by collaboratively reviewing sample student essays and grading rubrics. Faculty affiliated with these groups also conducted student focus groups to identify supplemental instruction options, such as writing labs in the high schools. Technology played a role in alignment activities too, with high school teachers taking the Compass exams so that they could experience the questions and format of the tests, leading some to align their content more closely to the Compass test and others to prepare students in the use of calculators.

In summary, compelling programmatic approaches of the River College CCR model included early college placement testing within the high schools; mathematics and English academic interventions on the college campus, including supplementary instruction and integrated student supports offered on the college campus; and enhanced curriculum alignment that emphasized content, instructional strategies, and assessment.
Analysis

In this section we use Conley’s four dimensions of college readiness to analyze the two CCR models. Recognizing that these colleges had the autonomy to implement a range of program components in association with Illinois’ CCR Pilot legislation, our analysis explores how, although different in design, the two sites achieved similar short-term outcomes that were better than the norm but still modest in terms of their contribution to students’ readiness for college.

“Reenvisioning” academic interventions. Despite their mutual goal of improving high school students’ readiness for college, one of the most striking differences between Prairie College and River College’s CCR programs was their means of structuring and delivering instructional content for their academic interventions, which we associate with Conley’s two dimensions of key cognitive strategies and key content knowledge. Whereas River College’s CCR program was delivered on the college campus through traditional 15-week courses, Prairie College’s CCR program was delivered in modules using self-paced commercially developed computer software. By offering an alternative to traditional developmental education in the form of computerized mathematics modules, Prairie College personnel believed they were moving away from antiquated conceptions of teaching and learning to individualized delivery of content that students needed to gain proficiency. One Prairie College faculty member explained the need for all community college students, including high school–age students, to be offered alternatives to the standard developmental education curriculum, saying:

Again it’s this traditional sequence. It didn’t work for the students. If they’re placing into arithmetic as a 30-year old, ya know, the traditional sequence didn’t work for them. I think what’s sort of being discussed right now is re-envisioning the developmental sequence so if you need arithmetic, we’re going to teach you arithmetic differently.

Reinvention of developmental education at Prairie College involved allowing high school students to move at their own pace to learn mathematics.

By comparison, some of River College’s most talented developmental education instructors offered mathematics and English courses associated with the CCR program on the college campus, along with supplemental instruction and student support services. The rationale shared with our team for this approach was that students would benefit from being introduced to the rigors of college in a supportive yet demanding college-like instructional environment. The intention of the CCR program seemed to be to emulate the college experience using the college’s most exceptional talent, along with instructional and support services that were geared to helping the students master the content and successfully complete the CCR program.

Endorsing curriculum alignment. Common to both Prairie College and River College, administrators and faculty believed that curriculum alignment contributed positively to students’ key content knowledge and key cognitive strategies. Reflecting this perspective, one Prairie College administrator said, “To me I think that’s [alignment] the
heart of the program really. Because they [faculty] are looking at the curriculum and alignment and that effort impacts all students, not just CCR students.” Sharing concerns about student failure of mathematics, a Prairie College math instructor observed the need for better alignment so that students don’t experience failure over and over throughout their high school and college careers:

We all know the way we teach math is not terribly successful. It doesn’t work in high school. We do the same thing in college. Why would we expect them [students] to learn it now? So, I mean, I think having the opportunity to re-envision what the math curriculum is versus what it could be [is important].

Alignment efforts associated with CCR were also attributed with uncovering misalignment of content previously unknown to faculty. Reflecting on a faculty workshop on English literacy, a department chair at River College said:

One pattern that I have noticed in high school workshops, and in the literature, is that a lot of school teachers make their assignments literary based because there is literature to teach with. . . . But at the college level, in our sequence here at River College, we don’t require much in the way of literary analysis . . . so the analysis in high school isn’t strong preparation for college.

If we assume that alignment efforts between high school and college faculty spreads over time, the importance of curriculum alignment to students’ acquiring key cognitive strategies and key content knowledge grows. Consistent with perspectives shared by River College personnel, an administrator at Prairie College noted how alignment of content to learning outcomes might help to improve students’ college readiness over time, saying: “I think those MIS systems are aligned around learning outcomes for the courses that are taught in the high school. So if those learning outcomes are aligned with . . . college courses, then we are all focused on getting students there [to college readiness].”

Getting the “college feel” versus accessibility. A fundamental difference between River College and Prairie College’s CCR programs was the location of instructional delivery. River College’s CIS program was offered on the college campus and taught by college faculty whereas Prairie College’s MIS program was located on the high school campus and typically taught by high school teachers. Prairie College offered a summer bridge program as well, but it was relatively small compared to CIS. Although River College had previously held a CCR class at a feeder high school, all academic interventions associated with CCR were moved from the high school to the college campus. A River College administrator explained the decision to move CCR to the college campus by saying, “students want the college feel,” and she also observed that the college campus “is a more casual atmosphere because high schools are strict whereas college it is more relaxed. It [college] is more self responsibility.” This explanation relates closely to Conley’s (2010) dimensions of key learning skills and techniques and key transition knowledge and skills or college knowledge. That is, Conley’s (2012)
college readiness framework seems to expect students’ independent motivation to learn, or what Conley calls ownership of learning. Similarly, understanding and experiencing the norms and expectations of a college environment are important elements of Conley’s key transition knowledge and skills dimension. As one River College administrator said, “The students told us that they [students] like being on the campus, and they become more used to what you need to do for college,” demonstrating adjustment to and readiness for college. As such, the CCR program at the River College seemed to provide students with key learning skills and techniques and key transition knowledge and skills, but it came at the expense of access. River College personnel noted that distance from the high schools to the college had a detrimental effect on student participation, with one college administrator admitting “we are losing them [students] because of transportation.” Though we are uncertain of precisely which students declined to participate, we suspect low-income students were the losers. This problem was overcome by Prairie College’s locating the MIS program at the high school, although again, looking at access overall, Prairie College’s CCR program enrollees were less representative of the Prairie College’s overall student population than River College.

Integrating and outsourcing “time for extra stuff.” Another difference in approach between Prairie College and River College was the extent to which the model was holistic, going beyond the cognitive domain and student supports. Both colleges integrated some noncognitive elements into their model, although timing and intensity differed between the two colleges. At River College, strategies to include key learning skills and key transition knowledge and skills were integrated with college knowledge. One administrator noted, “We have added about 20 minutes to every class period to give them [the students] more time to talk about some of the things like time management . . . [and] learning styles [that pertain to college]. . . . [We are] getting them to identify [for] themselves how they learn best.” Another River College instructor noted, “We deliberately don’t try to set it aside as ‘this is the time for extra stuff.’” Thus, River College was purposeful about integrating student support elements into the CSI program so college readiness was perceived not just as proficiency in the classroom or a test score on a standardized exam but more fully integrated with the college experience.

Prairie College also integrated time for “extra stuff” but in a different way and to a different degree. At Prairie College, key learning skills and transition knowledge and skills were not integrated into MIS, but mostly outsourced to high school instructors or to college experts. Since the Prairie College model was infused into the school day and offered on the high school campus, college personnel had to make deliberate efforts to deliver workshops to high school students. Otherwise, the college had to rely on high school personnel to deliver information. For example, when asked how students developed a plan after they received their results from the Compass test, Prairie College administrators noted that “the intent beyond the Compass testing is that high school advisors help them [students] to do that because they are trained to interpret these scores. . . . They learn what developmental education means and the time and
costs to the student,” but there was limited follow-up. The college also provided “general guidelines” for high schools, which were implemented in various ways. A good example was Prairie College’s KnowHow2GO campaign wherein college staff visited high schools to support their staff in delivering the KnowHow2GO messaging. As one Prairie College employee noted, “they wanted to do it themselves,” leaving college personnel uncertain of how fully information was conveyed to students in a manner consistent with the college’s intentions.

**Implications for Policy and Research**

To summarize, this study presented the short-term outcomes of students enrolled in two sites that participated in Illinois’ CCR pilot program. Qualitative data from Prairie College and River College show that there are diverse yet complementary ways that community colleges and their high school partners engage CCR programming to develop high school students’ college readiness. For example, both sites administered the college placement test to high school students and provided remedial mathematics and/or English instruction, yet their approaches and methods varied from one another considerably. Although the sites offered different approaches, both demonstrated some evidence of all four of Conley’s (2010, 2012) dimensions of college readiness. More promising short-term student outcomes were displayed for River College’s comprehensive CSI program, but still more than half of the students who participated in the mathematics intervention were not yet college ready at the conclusion of the CCR program. This finding reflects the enrollment of a sizeable proportion of students well below college level cut-off and unable to advance to college level after taking one 15-week developmental course, no matter how well taught and supported by support staff.

Qualitative results provided a deeper understanding of how the CCR programs operated and how they aligned with Conley’s CCR model. The comprehensive approach of River College addressed multiple facets of Conley’s framework, whereas Prairie College’s model emphasized key cognitive strategies and content with much less emphasis on college transition knowledge and skills, including college knowledge. Although these results do not provide rigorous evidence of program impact or explain why particular program elements affect student outcomes, they are instructive of the program elements that may benefit students. From these mixed-method results, deeper empirical investigations can be developed. More research is needed to determine how and why these programs produced the most promising though modest results of all of Illinois’ seven sites. For example, does the location (high school or college) of the academic intervention matter? Does the integration of support services affect students’ college readiness, over and above the delivery of content knowledge? If so, what do impactful student support services look like? Are the benefits of classroom instruction on the college campus compelling as compared to individualized instruction offered at the high school, where more students can access the programs? How much does the quality of instruction of developmental education matter to student outcomes? Do the effects of CCR programs vary for different student groups,
particularly for underserved students? As more states implement early college readiness assessments and transitional courses (Barnett et al., 2013; SREB, 2013), these questions deserve longitudinal research that examines the relationships between CCR models, program elements, and student outcomes, including experimental and quasi-experimental methods that account for selection bias.

These findings have important implications for Illinois as it progresses from its legislated CCR Pilot Initiative to implementation of CCR programs associated with STEM education as part of RttT. Related to the former, the Illinois General Assembly appropriated state funds for the CCR pilot initiative through June 30, 2013, but subsequent funds have utilized the RttT grant. As such, RttT provides a new group of community college and high school partnerships with funds to implement CCR-related mathematics programs, with an emphasis on helping students prepare for the rigors of college-level math pertaining to college majors and career opportunities in STEM. Results from our study suggest a comprehensive model, with content knowledge integrated with student support services, may be the best investment of RttT funds, but these results are far from definitive.

Limited evidence of student outcomes, including no student outcome results of more than short-term duration, is problematic. Until the state creates a P-20 data system that researchers can access to track students’ college readiness and transition from high school to college, only very limited rigorous research is possible on CCR because the studies are dependent on institutional data and local cooperation. Data quality issues were a persistent concern for our CCR research team, leading us to recommend a rigorous quasi-experimental design comparing CCR participants’ outcomes to comparable nonparticipants as part of RttT. An important aspect of this new study is to clearly and meaningfully define a theory of change and corresponding model and program elements that can not only move students toward college readiness but yield evidence of both short- and long-term student outcomes. No doubt a tall order, but one that is necessary to prepare future students for the desired college and career they seek to attain in Illinois and elsewhere.

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Public Law 095-0694, Section 5 of the Public Community College Act, Sec. 2.24.


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